INFRASTRUCTURE: WATER CONVEYANCE FACILITIES

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PURPOSE

Water conveyance is needed to distribute the primary inflow sources to the various habitat, air quality, and marine sea features under each of the proposed ecosystem restoration configurations. Water conveyance is also needed to route flood flows and circulate water to minimize human and ecological health risks.

RANGE OF ACTIONS

The water conveyance facilities under consideration include the following:

- Forebays and sedimentation basins,
- Canals and pipelines,
- Pumping plants,
- Drainage structures, and
- Flow regulating structures.

While all of these features serve similar functions, they differ in height, cross section, design materials, placement location, and construction method. These are described in detail below.

FOREBAYS AND SEDIMENTATION BASINS

Constructed forebays will serve as the main “collection area” to capture inflows from the New, Alamo and Whitewater rivers and distribute them to the various habitat, air quality, and marine sea features. These forebays will also serve as sedimentation basins to settle and remove some suspended and bedload silts from the rivers before being conveyed to the water treatment facilities or into canals. This will reduce maintenance and operational costs in the canals, pipelines, and treatment facilities. Sediment that accumulates in the forebays/sedimentation basins will have to be removed periodically. This material will be moved to the brine sink or used for habitat creation as appropriate. The forebays would include spillways to convey flood flows through the facilities and into the marine Sea or brine sink when necessary. An example facility schematic showing the possible facility complexity is shown in Figure 1.

While the proposed river confluence forebays capture most of the Valley’s drainage, some agricultural drainage flows directly into the Sea. On some configurations, drainage water will enter directly into the habitat areas. Selenium concentrations could be large from these sources if the river or treated water does not provide sufficient dilution. Additional facilities may be necessary to convey these agricultural drainages out of the habitats or through treatment facilities first.

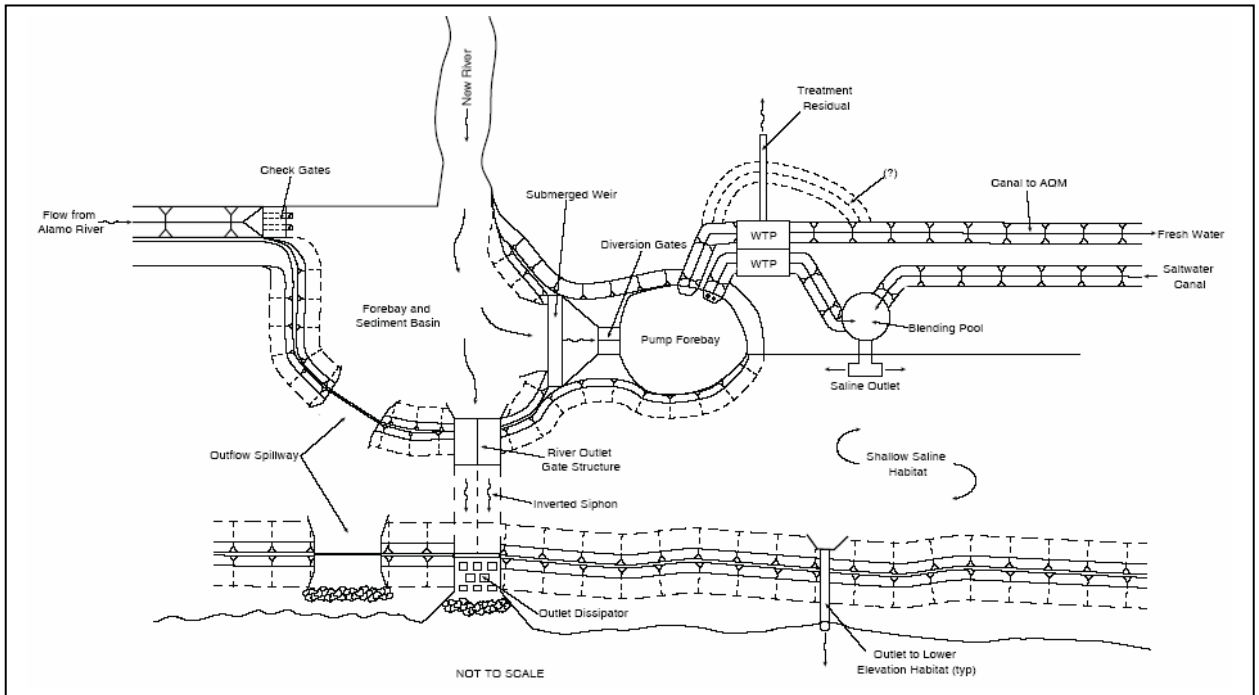

Figure 1.
Example forebay and sedimentation facility schematic.

CANALS AND PIPELINES

Canals and pipelines would be used to reliably convey both desilted river water and salt water to the habitat, air quality, and marine sea features in all of the configurations. There are many conveyance facilities needed to move water around the Sea with different water qualities. In some cases, water from these canals or pipelines is blended with other water to achieve a target salinity for the Sea, habitat, or air quality management areas. The conveyance complexity is dependant on where the water need is relative to where the source is (in both quality and quantity).

Canals will be used whenever practical, and pipelines will be used when the flows must be conveyed under existing drainages or where flows must be pressurized. Canals typically can convey water longer distances with few elevation drops. Treated water canals will be concrete lined, but other canals will be unlined.

Larger canals are planned to be constructed within the existing sea-bed along the upper contours to minimize impacts in the adjacent areas. Canal alignments and structures will be constructed to minimize existing drainage impacts and allow Desert Pupfish connectivity to continue within the Sea or constructed habitat. Having this supply at the upper contours will allow the irrigation systems to be set up along this alignment as well.

To regulate flows, canals would also include check structures, inlet and outlet gates, turnout structures, and similar features to regulate flows.

PUMPING PLANTS

Pumping plants are necessary to move water into treatment facilities or when water can not be conveyed to areas of need by gravity alone. Pumping plants are also used to circulate large volumes of water at low heads to improve water quality and control salinity in the configurations. Recirculation pumping plants are included in the Combined Sea and Concentric Ring configurations. They will blend higher salinity water with lower salinity inflows to keep salinities in the open sea at 20 mg/L or higher on average.

Smaller pumping facilities are needed to pressurize flows for the air quality management irrigation systems.

ASSUMPTIONS

The construction of the conveyance systems will likely occur at the same time as the barrier construction. Many of these canal alignments are within the existing sea-bed, so their construction may need to occur when Sea levels recede and construction is easier. Excavated spoils from the canal systems is used in the adjacent embankments, used to create nearby habitat features, or spoiled in the brine sink area. Seepage in these canals may be significant and may require lining in some areas. However, many of the canals will not require their full capacity until many years in the future when canal demands are the highest.